

THAT WHICH IS CLAIMED IS:

1. A contaminant solubilizing composition comprising:
- (a) about 1 to about 90 weight percent, based on the weight of the contaminant solubilizing composition, of an ester acid composition consisting essentially of at least one C₁ to C₄ ester of lactic acid;
- (b) about 1 to about 30 weight percent, based on the weight of the contaminant solubilizing composition, of at least one surfactant; and
- (c) up to about 98 weight percent, based on the weight of the contaminant solubilizing composition, of at least one solvent.
2. A contaminant solubilizing composition according to Claim 1, wherein said C₁ to C₄ ester of lactic acid is derived from a C₁ to C₄ alcohol selected from the group consisting of methanol, ethanol, propanol, isopropanol, allyl alcohol, butanol, 3-buten-1-ol, t-butanol and sec-butanol and mixtures thereof.
3. A contaminant solubilizing composition according to Claim 1, wherein said C₁ to C₄ ester of lactic acid is ethyl lactate.
4. A contaminant solubilizing composition according to Claim 1, wherein said C₁ to C₄ ester of lactic acid is present in an amount ranging from about 20 to about 60 weight percent.
5. A contaminant solubilizing composition according to Claim 1, wherein said surfactant is selected from the group consisting of isotridecyl alcohol tri-ethoxylate, polyethylene glycol ether of mixed synthetic C₉ -C₁₁ fatty alcohols having an average of about 6 moles of ethoxylate, polyethylene glycol ether of mixed synthetic C₁₁ -C₁₅ fatty alcohols having an average of 59 moles of ethoxylate, polyethylene glycol (6) nonylphenyl ether, polyethylene glycol (9) nonylphenyl ether, modified alkanolamide alkanolamine, phenol alkoxylates and mixtures thereof.
6. A contaminant solubilizing composition according to Claim 1, wherein said surfactant is derived from at least one C₁₀ to C₁₆ ethoxylated alcohol.

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7. A contaminant solubilizing composition according to Claim 1, wherein said surfactant is derived from a C₁₂ ethoxylated alcohol.

8. A contaminant solubilizing composition according to Claim 1, wherein said surfactant is present in an amount ranging from about 10 to about 20 weight percent.

5 9. A contaminant solubilizing composition according to Claim 1, wherein said solvent is selected from the group consisting of water, ethanol, methanol, isopropanol and mixtures thereof.

10. A contaminant solubilizing composition according to Claim 1, wherein said solvent is water.

10 11. A contaminant solubilizing composition according to Claim 1, wherein said solvent is present in an amount ranging from about 10 to about 50 weight percent.

12. A contaminant solubilizing composition according to Claim 1, further comprising at least one oil scavenger.

15 13. A contaminant solubilizing composition according to Claim 12, wherein said oil scavenger is selected from the group consisting of phosphated ethoxylate blends, stearic acid diethanolamide, sulphated and sulphited natural oils, sulphated and sulphited synthetic oils, polyethylene emulsions, polyethylene glycol esters, ethoxylated lanolin derivatives, fatty acid alylolamides, and mixtures thereof.

20 14. A contaminant solubilizing composition according to Claim 12, wherein said oil scavenger is a phosphated ethoxylate blend.

15 15. A contaminant solubilizing composition according to Claim 12, wherein said phosphated ethoxylate blend is a blend of phosphated phenol ethoxylate and phosphated castor oil ethoxylate.

25 16. A contaminant solubilizing composition according to Claim 12, wherein said phosphated ethoxylate blend comprises a blend of about 20 parts phosphated phenol ethoxylate to about 80 parts phosphated castor oil ethoxylate.

17. A contaminant solubilizing composition according to Claim 12, wherein said oil scavenger is present in an amount ranging from about 10 to about 20 weight percent, based on the weight of the contaminant solubilizing composition.

18. A contaminant solubilizing composition according to Claim 12, wherein said C₁ to C₄ ester of lactic acid is ethyl lactate;
said surfactant is C₁₀ to C₁₆ ethoxylated alcohol;
said oil scavenger is a blend of phosphated phenol ethoxylate and phosphated castor oil ethoxylate; and
said solvent is water.

19. A contaminant solubilizing composition according to Claim 18, comprising:

- (a) about 42 weight percent C₁ to C₄ ester of lactic acid;
- (b) about 15 weight percent surfactant;
- (c) about 15 weight percent oil scavenger; and
- (d) about 28 weight percent solvent.

20. A contaminant solubilizing composition comprising:

- (a) about 1 to about 90 weight percent, based on the weight of the contaminant solubilizing composition, of at least one C₁ to C₄ ester of lactic acid;
- (b) about 1 to about 30 weight percent, based on the weight of the contaminant solubilizing composition, of at least one surfactant; and
- (c) up to about 97 weight percent, based on the weight of the contaminant solubilizing composition, of at least one solvent; and
- (d) about 1 to about 30 weight percent, based on the weight of the contaminant solubilizing composition, of at least one oil scavenger.

21. A contaminant solubilizing composition according to Claim 20, wherein said C₁ to C₄ ester of lactic acid is ethyl lactate.

22. A contaminant solubilizing composition according to Claim 20, wherein said surfactant is derived from at least one C₁₀ to C₁₆ ethoxylated alcohol.

23. A contaminant solubilizing composition according to Claim 20, wherein said solvent is water.

24. A contaminant solubilizing composition according to Claim 20, wherein said oil scavenger is a phosphated ethoxylate blend.

5 25. A contaminant solubilizing composition according to Claim 24, wherein said phosphated ethoxylate blend is a blend of phosphated phenol ethoxylate and phosphated castor oil ethoxylate.

26. A contaminant solubilizing composition according to Claim 20, wherein:
said C₁ to C₄ ester of lactic acid is ethyl lactate;
10 said surfactant is a C₁₀ to C₁₆ ethoxylated alcohol;
said oil scavenger is a blend of phosphated phenol ethoxylate and phosphated castor oil ethoxylate; and
said solvent is water.

27. A textile cleaning composition comprising:
15 (a) a contaminant solubilizing composition comprising at least one C₁ to C₄ ester of lactic acid in an amount sufficient to solubilize at least a portion of the contaminants located on the surface of textile processing equipment or at or near the surface of polyester fiber;

(b) at least one alkaline compound in an amount sufficient to provide a pH of
20 at least about 9.0 to said textile cleaning composition; and

(c) at least one reducing chemical in an amount sufficient to solubilize at least a portion of any residual dyestuffs present on the surface of said textile processing equipment or at or near the surface of said polyester fiber.

28. A textile cleaning composition according to Claim 27, wherein said
25 contaminant solubilizing composition further comprises at least one surfactant.

29. A textile cleaning composition according to Claim 28, wherein said contaminant solubilizing composition further comprises at least one oil scavenger.

30. A textile cleaning composition according to Claim 29, wherein:
said C₁ to C₄ ester of lactic acid is ethyl lactate;
said surfactant is a C₁₀ to C₁₆ ethoxylated alcohol;
said oil scavenger is a blend of phosphated phenol ethoxylate and phosphated
5 castor oil ethoxylate.

31. A textile cleaning composition according to Claim 30, wherein said
contaminant solubilizing composition further comprises:

- (a) about 42 weight percent of said ethyl lactate;
- (b) about 15 weight percent of said C₁₀ to C₁₆ ethoxylated alcohol; and
- 10 (c) about 15 weight percent of said blend of phosphated phenol ethoxylate
and phosphated castor oil ethoxylate.

32. A textile cleaning composition according to Claim 27, wherein said
reducing chemical is selected from the group consisting of sodium hydrosulfite, thiourea
dioxide and mixtures thereof.

15 33. A textile cleaning composition according to Claim 27, wherein said at
least one alkaline compound is sodium hydroxide.

34. A textile cleaning composition according to Claim 27, wherein said
contaminant solubilizing composition is present within said textile cleaning composition
in an amount of about 2 weight percent, based on the weight of the textile cleaning
20 composition.

35. A textile cleaning composition according to Claim 27, wherein said
contaminant solubilizing composition is present within said textile cleaning composition
in an amount of about 4 weight percent, based on the weight of the textile cleaning
composition.

25 36. A method of solubilizing contaminants from the surfaces of dye machines
or polyester fibers, said method comprising:

- (a) forming a textile cleaning composition within a dye machine by
 - (i) at least partially filling the dye machine with water; and

(ii) introducing a contaminant solubilizing composition comprising at least one C₁ to C₄ ester of lactic acid into the water within the dye machine, thereby diluting said contaminant solubilizing composition;

(b) heating the textile cleaning composition to a temperature sufficient to
5 promote the solubilization of at least a portion of the contaminants present on or near the surface of either the dye machine or the polyester fiber;

(c) circulating the textile cleaning composition for a dwell time sufficient to promote the solubilization of at least a portion of the contaminants present on or near the surface of either the dye machine or the polyester fiber; and

10 (d) draining the recirculated textile cleaning composition from the dye machine.

37. A method of solubilizing contaminants according to Claim 36, further comprising the steps of:

(a) adjusting the diluted contaminant solubilizing composition to a pH of at
15 least about 9.0; and

(b) introducing at least one reducing chemical into the alkaline contaminant solubilizing composition.

38. A method of solubilizing contaminants according to Claim 36, wherein said contaminant solubilizing composition further comprises at least one surfactant.

20 39. A method of solubilizing contaminants according to Claim 38, wherein said contaminant solubilizing composition further comprises at least one oil scavenger.

40. A method of solubilizing contaminants according to Claim 36, wherein:
said C₁ to C₄ ester of lactic acid is ethyl lactate;
said surfactant is a C₁₀ to C₁₆ ethoxylated alcohol; and
25 said oil scavenger is a blend of phosphated phenol ethoxylate and phosphated castor oil ethoxylate.

41. A method of solubilizing contaminants according to Claim 40, wherein:
- (a) said C₁ to C₄ ester of lactic acid is present in an amount of about 42 weight percent based on the weight of the contaminant solubilizing composition;
 - (b) said surfactant is present in an amount of about 15 weight percent based on the weight of the contaminant solubilizing composition; and
 - (c) said oil scavenger is present in an amount of about 15 weight percent based on the weight of the contaminant solubilizing composition.
42. A method of solubilizing contaminants according to Claim 36, wherein said contaminant solubilizing composition is present within the textile cleaning composition in an amount of about 2 weight percent, based on the weight of the textile cleaning composition.
43. A method of solubilizing contaminants according to Claim 36, wherein said contaminant solubilizing composition is present within the textile cleaning composition in an amount of about 4 weight percent, based on the weight of the textile cleaning composition.
44. A method of solubilizing contaminants according to Claim 36, wherein the reducing chemical is selected from the group consisting of sodium hydrosulfite, thiourea dioxide and mixtures thereof.
45. A method of solubilizing contaminants according to Claim 36, wherein the heating step further comprises heating the textile cleaning composition to temperature of up to about 270°F.
46. A method of solubilizing contaminants according to Claim 36, wherein the circulating step further comprises circulating the heated textile cleaning composition for a dwell time of about 15 minutes.
47. A method of dyeing textile articles, said method comprising:
- (a) forming a dye machine cleaning composition within a dye machine by
 - (i) at least partially filling the dye machine with water; and

(ii) introducing a first contaminant solubilizing composition comprising at least one C₁ to C₄ ester of lactic acid into the water within the dye machine;

(b) heating the dye machine cleaning composition to temperature of up to about 270°F;

5 (c) circulating the heated dye machine cleaning composition for a time sufficient to remove at least a portion of the contaminants from the surface of the dye machine;

(d) draining the recirculated dye machine cleaning composition from the dye machine;

10 (e) at least partially refilling the drained dye machine with water;

(f) introducing a defoaming composition comprising

(i) at least one defoamer; and

(ii) at least one acidic compound;

(g) draining the defoaming composition from the dye machine;

15 (h) loading the dye machine with textile articles;

(i) dyeing the textile articles within the dye machine;

(j) cooling the dye machine containing the dyed textile articles to a temperature ranging from about 140°F to about 180°F;

(k) forming a reduction clearing composition within the cooled dye machine
20 by introducing at least one reducing chemical and a second contaminant solubilizing composition comprising at least one C₁ to C₄ ester of lactic acid;

(l) circulating the reduction clearing composition within the dye machine for a time sufficient to remove at least a portion of the contaminants on or near the surface of the textile articles;

25 (m) rinsing the reduction clearing composition from the textile articles; and

(n) unloading the rinsed textile articles from the dye machine.

48. A method of dyeing textile articles according to Claim 47, wherein the first contaminant solubilizing composition is present in the dye machine cleaning composition in an amount of about 2 weight percent, based on the weight of the dye
30 machine cleaning composition.

49. A method of dyeing textile articles according to Claim 47, wherein the second contaminant solubilizing composition is present in the reduction clearing composition in an amount of about 4 weight percent, based on the weight of the reduction clearing composition.

5 50. A method of dyeing textile articles according to Claim 47, wherein at least one of the first or second contaminant solubilizing compositions further comprises at least one surfactant.

51. A method of dyeing textile articles according to Claim 47, wherein at least one of the first or second contaminant solubilizing compositions further comprises at
10 least one oil scavenger.

52. A method of scouring textile articles, said method comprising:

(a) forming a scouring composition within at least one of the scouring baths of a scouring range by

(i) at least partially filling the scouring bath with water;
15 (ii) introducing a contaminant solubilizing composition comprising at least one C₁ to C₄ ester of lactic acid into the water within the scouring bath thereby forming an intermediate composition; and

(iii) introducing at least one foaming agent into either the water or intermediate composition within the scouring bath; and

20 (b) bringing a textile article into contact with the scouring composition for a dwell time sufficient to solubilize at least a portion of the contaminants present at or near the surface of the textile article.

53. A non-destructive method for removing contaminants from the surface of textile articles or the manufacturing equipment used to produce textile articles, said
25 method comprising

(a) applying an effective amount of a contaminant solubilizing composition comprising an effective amount of C₁ to C₄ ester of lactic acid to the surface of the textile article;

(b) treating the surface of the textile article with the contaminant solubilizing composition for an effective amount of time; and

(c) rinsing the contaminant solubilizing composition from the surface of the textile article.

5 54. A method according to Claim 53, wherein said contaminant solubilizing composition further comprises at least one surfactant.

55. A method according to Claim 54, wherein said contaminant solubilizing composition further comprises at least one oil scavenger.

10 56. A method according to Claim 53, wherein:
said C₁ to C₄ ester of lactic acid is ethyl lactate;
said surfactant is a C₁₀ to C₁₆ ethoxylated alcohol; and
said oil scavenger is a blend of phosphated phenol ethoxylate and phosphated
castor oil ethoxylate.

15 57. A method according to Claim 53, wherein the textile article is selected from the group consisting of fiber, yarn, fabric and film.